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The United States of America



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Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.

If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.

If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the U.S. filing date, subject to any statutory extension. If the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121 or 365(c), the term of the patent is twenty years from the date on which the earliest application was filed, subject to any statutory extension.


Bruce Lehman

Commissioner of Patents and Trademarks


Marjorie V. Turner

Attest



US005662731A

United States Patent [19]

Andersen et al.

[11] Patent Number: 5,662,731

[45] Date of Patent: Sep. 2, 1997

[54] COMPOSITIONS FOR MANUFACTURING FIBER-REINFORCED, STARCH-BOUND ARTICLES HAVING A FOAMED CELLULAR MATRIX

[75] Inventors: Per Just Andersen; Simon K. Hodson, both of Santa Barbara, Calif.

[73] Assignee: E. Khashoggi Industries, Santa Barbara, Calif.

[21] Appl. No.: 327,524

[22] Filed: Oct. 21, 1994

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 288,664, Aug. 9, 1994, and Ser. No. 288,667, Aug. 9, 1994, which is a continuation-in-part of Ser. No. 218,971, Mar. 25, 1994, Ser. No. 109,100, Aug. 18, 1993, abandoned, Ser. No. 95,662, Jul. 21, 1993, Pat. No. 5,385,764, and Ser. No. 982,383, Nov. 25, 1992, abandoned, each is a continuation-in-part of Ser. No. 929, 898, Aug. 11, 1992, abandoned, said Ser. No. 288,664, is a continuation-in-part of Ser. No. 929,898.

[51] Int. Cl. 6 C04B 14/38; C08L 3/02

[52] U.S. Cl. 106/206.1; 106/217.01; 106/400; 521/68; 521/84.1; 536/102; 536/107; 523/128

[58] Field of Search 524/442, 445, 524/449, 493; 521/68, 84.1; 536/102, 107; 523/128; 106/206.1, 217.01, 400

[56] References Cited

U.S. PATENT DOCUMENTS

2,432,971	12/1947	Ruthman et al.
2,968,561	1/1961	Bimkran.
3,042,578	7/1962	Denning.
3,052,595	9/1962	Pye.
3,117,014	1/1964	Klug.
3,493,382	2/1970	Ryan et al.
3,759,729	9/1973	Fahn.
3,914,359	10/1975	Bevan.
3,949,145	4/1976	Otey et al.
3,962,155	6/1976	Usamoto et al.
3,968,004	7/1976	Coffey et al.
4,017,324	4/1977	Eggers.
4,043,862	8/1977	Roberts.
4,044,166	8/1977	Koizumi.
4,070,196	1/1978	Kraak et al.
4,076,547	2/1978	Lester et al.
4,080,213	3/1978	Mori et al.
4,089,691	5/1978	Cummisford et al.
4,124,550	11/1978	Kobayashi et al.
4,133,784	1/1979	Otey et al.
4,149,550	4/1979	Green et al.
4,172,154	10/1979	von Rymon Lipinski.
4,210,490	7/1980	Taylor.

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

0118240 B1	9/1984	European Pat. Off.
0265745 A2	5/1988	European Pat. Off.
0304401 B1	2/1989	European Pat. Off.
0271853 B2	2/1989	European Pat. Off.
0340707 A2	11/1989	European Pat. Off.
0405146 B1	1/1990	European Pat. Off.

0370913 B1	5/1990	European Pat. Off.
0447797 A2	9/1991	European Pat. Off.
0453980 A2	10/1991	European Pat. Off.
0546956 A2	6/1993	European Pat. Off.
0551954 A2	7/1993	European Pat. Off.
0608031 A1	7/1994	European Pat. Off.
0609983 A2	8/1994	European Pat. Off.

(List continued on next page.)

OTHER PUBLICATIONS

Bishop, Cotton, Wool and Silk, Make Way For Soybeans, Wall Street Journal (Jan. 14, 1993).

Clark, The Incredible, Edible Plastic, Ag Consultant (May 1993).

Howard, Universities Make Plea For Cash, . . . Register (Feb. 11, 1993).

Iowa State University, Crop Utilization Research/Crop Products Pilot Plant, Utilization Center for Agricultural Products, Ames, Iowa. (no date).

Lane, SoyDiesel: Promising New Market For Soy Oil/Soybeans Come Callin' On Utensils, Soybean Digest, vol. 54, No. 11 (Dec. 1994).

Lucht, Product Research Aimed At Propping Up Crop Prices, Iowa Farmer Today, NW Edition (Jan. 16, 1993).

McMurray, For People Without Livestock, Growing Children Should Do Fine, The Wall Street Journal (Mar. 31, 1993).

United Soybean Board, New Uses For Soybeans/The Best Is Yet To Be. (no date).

Zinkand, New EcoPLA Plastic Stretches Corn Use, Iowa Farmer Today, NW Edition (Apr. 2, 1994).

(List continued on next page.)

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[57] ABSTRACT

Compositions, methods, and systems for manufacturing articles, particularly containers and packaging materials, having a fiber-reinforced, starch-bound cellular matrix. Suitable mixtures used to form the articles are prepared by first preparing a viscous preblended mixture comprising water, a gelatinized starch-based binder, and fibers having an average length greater than about 2 mm. The highly viscous preblended mixture effectively transfers the shearing forces of the mixer to the fibers. The final moldable mixture is then prepared by mixing into the preblended mixture the remaining starch-based binder, water, and other desired admixtures, e.g., mold-releasing agents, inorganic filler rheology-modifying agents, plasticizers, coating materials, and dispersants, in the correct proportions to form an article which has the desired performance criteria. The moldable mixtures are heated between molds at an elevated temperature and pressure to produce form-stable articles having a desired shape and a selectively controlled foamed structural matrix. The articles may be manufactured to have properties substantially similar to articles presently made from conventional materials like paper, paperboard, polystyrene, plastic, or other organic-based materials and have especial utility in the mass-production of containers, particularly food and beverage containers.